International Journal of Intercultural Relations 63 (2018) 95–104

Contents lists available at ScienceDirect

International Journal of Intercultural Relations

journal homepage: www.elsevier.com/locate/ijintrel

Self-determined motivation for studying abroad predicts lower culture shock and greater well-being among international students: The mediating role of basic psychological needs satisfaction☆

Ying Yang[a,b,*], Yixin Zhang[b], Kennon M. Sheldon[b,c]

[a] Beijing Key Laboratory of Applied Experimental Psychology, Institute of Developmental Psychology, Beijing Normal University, Beijing, China
[b] Department of Psychological Sciences, University of Missouri, Columbia, USA
[c] International Laboratory of Positive Psychology of Personality and Motivation, National Research University Higher School of Economics, Russia

ARTICLE INFO

Keywords:
Self-determined motivation
Culture shock
Subjective well-being
Basic psychological needs satisfaction

ABSTRACT

Study abroad programs are becoming increasingly popular, yet leaving home to live in a foreign country can be very stressful. We tested the idea that self-determined motivation to study abroad can prevent students from experiencing culture shock and support their subjective well-being, using a sample of 131 international students studying in the United States. After controlling for demographic variables, personality traits, length of stay in the United States, and external difficulties (e.g., language), self-determined study abroad motivation was associated with lower culture shock and greater contextual subjective well-being. Furthermore, basic psychological needs satisfaction fully mediated these relationships. The present study shows that international students' motivation influences their acculturation, by helping them to meet their own needs in the new context. Theoretical and practical implications, as well as study limitations, are discussed.

Introduction

Studying abroad, especially in the case of foreign students coming to the United States (U.S.), has become increasingly popular in recent decades. In the 2015–2016 academic year, over 300,000 new international students enrolled in American higher education (Institute of International Education, 2016). Of course, such intercultural experiences can bring many benefits, such as cultural learning and personal growth through cross-cultural adjustment (Adler, 1975). However they can also bring great challenges for international students, as they leave their familiar world behind, and try to adjust to a new physical, cultural, and linguistic location (Smith & Khawaja, 2011). Due to difficulties in communication, lack of social support, and unsettling cultural differences, foreign students sometimes report a profound sense of isolation (Brislin & Yoshida, 1994), intense feelings of depression (Ying & Liese, 1991), and plummeting levels of subjective well-being (i.e, lower satisfaction, lower positive affect and also higher negative affect) (Chirkov, Vansteenkiste, Tao, & Lynch, 2007). Moreover, some international students even suffer from the experience of "culture shock". Oberg (1960, p. 177) first described culture shock as "precipitated by the anxiety that results from losing all our familiar signs and symbols of social intercourse". Recent literature described culture shock as maladaptive psychological reactions and mental disorders that occur in response to the transition from one cultural setting to another (Harvey & Park, 2012). Research has demonstrated that the experience of culture shock also negatively impacts international students' psychological and sociocultural adaptation (Presbitero,

☆ This research was supported by the Russian Academic Excellence Project '5-100' and by the Russian Foundation for Basic Research.
* Corresponding author at: Institute of Developmental Psychology, Beijing Normal University, 19 Xinjiekouwai Street, Haidian District, Beijing, 100875, China.
E-mail address: 1990yy02@163.com (Y. Yang).

http://dx.doi.org/10.1016/j.ijintrel.2017.10.005
Received 17 May 2017; Received in revised form 19 October 2017; Accepted 21 October 2017
Available online 27 October 2017
0147-1767/ © 2017 Elsevier Ltd. All rights reserved.

2016). Given these potential negative consequences, it seems imperative to discover factors that can protect international students from culture shock and unhappiness.

Despite limited research showing that motivational factors play a significant role in predicting psychological and sociocultural adaptation (e.g., Gezentsvey & Ward, 2008), motivational factors still have been seriously neglected in studies of cross-cultural adjustment. Two studies have taken the perspective of self-determination theory (SDT) to examine the relationship between international students' self-determined motivation and their subjective well-being (Chirkov, Safdar, Guzman, & Playford, 2008; Chirkov et al., 2007). These studies found that international students indeed vary in their level of self-determined motivation for coming to the U.S. (Chirkov et al., 2007), and further revealed that self-determined motivation is correlated with greater psychological well-being, higher objective social-cultural adjustment (e.g., language preference), and fewer general psychosomatic symptoms (Chirkov et al., 2008). However, neither study tested whether self-determined motivation could mitigate against international students' experiences of culture shock, as specifically operationalized in terms of maladaptive psychological reactions to an unfamiliar cultural environment. In addition, neither Chirkov et al. (2007, 2008) study examined the underlying mechanisms through which adaptive motivation mitigates against culture shock and supports well-being. Finally, neither study examined and controlled for alternative predictors of culture shock and well-being, such as personality traits, length of stay in the host country, and external difficulties in communication. Our study sought to address these gaps in the literature, while also providing new avenues for designing interventions to help international students.

Self-determined motivation for studying abroad

According to SDT (Deci & Ryan, 2000; Ryan & Deci, 2017), all behaviors vary with respect to their degree of felt autonomy or self-determination, differences which are associated with different functional outcomes. Specifically, SDT proposes that all behaviors can be located on a continuum ranging from feeling completely controlled and non-self-determined, to feeling fully autonomous and self-determining (Deci & Ryan, 2000). Self-determined (autonomous) motivation is characterized by an internal perceived locus of causality, in which the person feels he or she causes himself or herself to act (Ryan & Connell, 1989). Self-determined behavior typically feels congruent with one's own will and preferences, reflecting intrinsic interests and personally endorsed values (Sheldon, Osin, Gordeeva, Suchkov, & Sychev, 2017). On the other hand, non-self-determined (controlled) motivation is characterized by an external perceived locus of causality, in which the person feels forced to act. Such behavior typically feels controlled by external contingencies (e.g., material rewards) or by internal pressure (e.g., guilt) (Ryan & Deci, 2000b).

Especially when applying SDT within cultural research, it is necessary to differentiate the concept of autonomy from the concept of individualism. Individualism refers to cultural practices and types where priority is given to the individual's needs, goals, and preferences, rather than to the group's needs, goals and preferences (i.e., collectivistic practices and types). SDT claims that autonomy can exist in either type of culture, and that, properly understood, autonomy is not equivalent to individualism; nor is autonomy equivalent to other self-centered concepts like pleasure, selfishness, ego-involvement, callousness, or materialism. Instead, autonomy involves the experience of being self-regulating, rather than of being controlled by others or by circumstances.

It is true that the experience of self-determination might somewhat vary in different cultural settings (e.g., Ginevra et al., 2015). Also, people in individualistic cultures typically feel more autonomous and self-regulating (Chirkov et al., 2008), on average, than people in collectivistic cultures (Church et al., 2013). However, SDT posits that autonomy reflects a universal propensity of human beings to try to be the masters of their own actions, regardless of their culture (Chirkov, 2007). Numerous cross-cultural studies have demonstrated that self-determined motivation occurs in both collectivistic and individualistic cultural settings (Chirkov, 2007), and is universally beneficial for individuals' well-being and optimal functioning in varied domains (Sheldon, Cheng, & Hilpert, 2011).

For instance, self-determined motivation for studying a second language negatively predicted American students' anxiety, but positively predicted their intention to continue studying (Noels, Pelletier, Clement, & Vallerand, 2000). Similarly, studies on Chinese learners demonstrated that, when they were driven by self-determined (vs. controlled) academic motivation, they showed more adaptive learning attitudes, higher academic performance, and greater personal well-being (Vansteenkiste, Zhou, Lens, & Soenens, 2005). In addition, self-determined motivation is positively correlated with Canadian swimmers' persistence (Pelletier, Fortier, Vallerand, & Brière, 2001), and Greek adolescents athletes' better coping strategies and daily effort (Mouratidis & Michou, 2011). Cross-cultural research has found that self-determined motivation positively predicted psychological well-being across four types of cultural environments (horizontal individualism and collectivism, and vertical individualism and collectivism), sampled in six different countries (Chirkov, Ryan, Kim, & Kaplan, 2003; Chirkov, Ryan, & Willness, 2005).

In the current study, using a comprehensive and widely applicable measure of self-determined motivation (Sheldon et al., 2017), we intended to examine how self-determined motivation for studying abroad relates to international students' culture shock as well as their subjective well-being. Based on the literature reviewed above, our first hypothesis was that self-determined motivation for studying abroad would be positively associated with international students' subjective well-being, and would be negatively associated with culture shock.

Self-determined motivation, basic psychological needs satisfaction, and acculturation

What is the underlying mechanism that accounts for the expected relationship between self-determined motivation and international students' positive acculturation? SDT proposes that human beings have three innate psychological needs—autonomy, competence, and relatedness—that serve as experiential nutriments for growth and optimal functioning (Ryan & Deci, 2017). Specifically, autonomy involves feelings of volition and self-authorship, rather than feelings of being forced to act. Competence involves

feelings of effectiveness and mastery rather than feelings of failure or incompetence. Relatedness is characterized by feelings of meaningful connection and belongingness with significant others, rather than isolation or loneliness (Ryan & Deci 2000a, 2000b). SDT suggests that optimal development and well-being require the satisfaction of all three needs; one or two are not enough (Deci & Ryan, 2000). Abundant correlation, experimental, and longitudinal research has supported the SDT proposition that three basic psychological needs satisfaction increases well-being (Sheldon & Elliot, 1999; Sheldon et al., 2010), decreases negative emotions such as loneliness and anxiety (Deci et al., 2001; Wei, Shaffer, Young, & Zakalik, 2005), and facilitates adaptive coping to stressful environments (Quested et al., 2011). Herein, we expected to find a positive link between satisfaction of the three basic psychological needs and international students' adaptive acculturation (i.e., enhanced subjective well-being and reduced culture shock).

Numerous studies have revealed positive associations of self-determined motivation with basic psychological needs, across multiple life-domains (e.g., Filak & Sheldon, 2008; Gunnell et al., 2014; Sheldon & Elliot, 1999; Weinstein & Ryan, 2010). When people act on the basis of their own internal preferences and psychological condition, they are better able to procure satisfying experiences for themselves than when they react in response to environmental demands. We assume that students making a self-determined decision to study in the U.S. will feel a greater sense of volition in the new venue (greater autonomy), and be enabled to perform better in their studies (greater competence), given that self-determined academic motivation has been consistently shown to improve students' competence (e.g., Black & Deci, 2000). Furthermore, self-determined students might be more likely to take initiative to participate in social activities and establish social relationships in the new environment, which generates a sense of connectedness that overcomes feelings that others are strangers (Kwok, Chui, & Wong, 2013; Weinstein & Ryan, 2010). Such students should be more actively involved in socializing (Chirkov et al., 2008), and should have more chances to develop new friendships and collaborations (Weinstein & Ryan, 2010; Sawir et al., 2008). Based on this reasoning, we hypothesized that aggregate need-satisfaction would mediate the link between self-determined motivation and positive outcomes. In other words, self-determined motivated international students (i.e., because of curiosity, interest, and identification, not because of family pressure, guilt, or a reward orientation) should better get their basic psychological needs met, explaining why they do not experience as much culture shock or as little well-being.

Alternative variables

We also examined several other plausible predictors of culture shock and adaptation, to rule them out and to establish the singular importance of self-determined motivation. The ABC model of culture shock proposes three components—affect, behavior and cognition—that affect individuals' cross-cultural adjustment (Ward, Bochner, & Furnham, 2001). The affective aspect refers to personal adjustment factors, such as personality and coping style. Since the big five personality traits are fundamental measures of personality and have been shown to robustly affect cultural adaptation (Fang, Friedlander, & Pieterse, 2016), we selected them as primary alternative predictors. The behavioral aspect of the ABC model focuses on social or language skills that may contribute to adaption in new cultural settings (Zhou, Jindal-Snape, Topping, & Todman, 2008). Thus, we measured international students' external difficulties (i.e., difficulties in language, communication, and surroundings), as they reflect culture-specific competence, skill and performance, and they have been shown to affect students' adjustment (Goldstein & Keller, 2015). The cognitive aspect refers to cognitive skills or proficiencies that benefit individuals' acculturation. We measured international students' prior knowledge of the U.S and the previous international travel experience, as the cognitive aspect of acculturation. Finally, the effects of demographic variables, including age, gender and length of stay in the host country (Zhang & Goodson, 2011), were also examined in the current study.

Taken together, the present study intended to test the effect of international students' self-determined motivation for studying abroad on their culture shock and contextual subjective well-being, and to examine the mediating role of basic psychological needs satisfaction. Based on the aforementioned studies, we proposed the following hypotheses: Hypothesis 1. Self-determined motivation would be negatively related to culture shock. Hypothesis 2. Self-determined motivation would be positively related to subjective well-being. Hypothesis 3a. Basic psychological needs satisfaction would mediate the negative relationship between self-determined motivation and culture shock. Hypothesis 3b. Basic psychological needs satisfaction would mediate the positive relationship between self-determined motivation and subjective well-being.

Methods

Participants and procedures

Participants were one hundred and thirty-one International students (44% male and 56% female) currently studying in the U.S. Most of them studied at the University of Missouri (77%), and others (23%) studied at other universities in the U.S. Fifty-four percent of participants were 18–25 years old, and 46% were above 25 years old. Participants came from 46 different countries; the majority were Asian (72%) (48% of Asian were Chinese), 12% were European, 6% were North American, 6% were South American, and 4% were other. The hyperlink to the questionnaire was distributed through a Missouri international center listserv, through online forums, and through email. A lottery incentive was provided to boost participation; specifically, five $50 dollar prizes were offered. All the research procedures met the ethical guidelines of the American Psychological Association and were approved by the Institutional Review Board (IRB).

Measures

Self-determined motivation for studying abroad

Student's motivation to study abroad was measured through a new but well-validated self-determined motivation instrument—the Comprehensive Relative Autonomy Index (CRAI; Sheldon et al., 2017). The CRAI was developed on the basis of a thorough content analysis of all existing RAI scales, and is designed to be applicable within any life-domain. We applied the CRAI by asking students to indicate their reasons for choosing to study in the U.S. The instrument includes six subscales (each containing 4 items), corresponding to six regulation types representing different levels of autonomy. The *amotivation* subscale reflects the extent to which students study abroad without specific reason or intention (e.g., "Honestly, I don't know why I chose to study in the U.S."). *External regulation* reflects the extent to which students were motivated to study abroad by external contingencies, like gaining rewards or avoiding punishments (e.g., "Because if I didn't study in the U.S., others would get mad"). *Negative introjected regulation* represents the degree to which students study abroad due to the avoidance of internalized pressures, like guilt or shame (e.g., "Because I would feel guilty if I didn't study in the U.S."). *Positive introjected regulation* refers to the extent to which students were motivated to study abroad by approaching self-worth and self-esteem (e.g., "Because I wanted to feel proud of myself"). *Identified regulation* represents the degree to which students recognize and accept the underlying value of studying abroad (e.g., "Because I strongly valued studying in the U.S"). *Intrinsic regulation* refers to the extent to which students were motivated by the enjoyment and they thus wholeheartedly want to study abroad (e.g., "Because I would enjoy studying in the U.S"). Participants were asked to rate their agreements with each reason using a 1 (*Strongly disagree*) to 5 (*Strongly agree*) scale. Sheldon et al. (2017) applied the CRAI measure in three behavioral domains (i.e., attending class, studying a major, and taking responsibility) within both American and Russian samples, and the results showed the CRAI was equivalent across these two cultures, and the self-determined motivation validly predicted greater well-being in both culture within different behavioral domains. They also demonstrated that the six subscales do in fact line up on a unidimensional continuum. Our data showed good internal consistency for each subscale (αs ranging from 0.76 to 0.92), and our six subscales could also be located on the same continuum. Thus, we computed a composite self-determined motivation score using the following formula: intrinsic + identified + positive introjected − negative introjected − external − amotivation (Sheldon et al., 2017; $\alpha = 0.84$). A higher score indicates a higher level of self-determined motivation for studying abroad.

Basic psychological needs satisfaction

We adopted the18-item Balanced Measure of Psychological Needs (BMPN; Sheldon & Hilpert, 2012) to measure students' need-satisfaction, specifically as experienced within the U.S. The BMPN includes three subscales, with 6 items for each subscale, measuring autonomy, competence, and relatedness needs satisfaction respectively. Previous research has validated the BMPN in different cultures (e.g., Neubauer & Voss, 2016). Participants read, "how have you felt during your study in the U.S.?" and responded on a 5-point scale ranging from 1 (*Strongly disagree)* to 5 (*Strongly agree*). Sample items included: "I have felt free to do things my own way" (autonomy), "I have been successfully completing difficult tasks and projects" (competence), and "I have felt a sense of contact with people who care for me, and whom I care for" (relatedness). Scores were calculated for each basic psychological need, with higher scores indicated higher levels of satisfaction. Reliability was adequate for each subscale and for the total scale (autonomy, $\alpha = 0.71$, competence, $\alpha = 0.70$, relatedness, $\alpha = 0.65$, total scale, $\alpha = 0.84$).

Culture shock

Culture shock was measured using the 12-item culture shock questionnaire (Mumford, 1998). Previous studies have shown this questionnaire to be suitable to measure international students' culture shock experience (Yoo, Matsumoto, & LeRoux, 2006). This questionnaire includes two subscales: core shock, which measured individuals' negative experiences specifically in new cultural settings (seven items; e.g., "Do you feel strain from the effort to adapt to a new culture*?"*); interpersonal stress, which referred to negative feelings when getting along with people in new environments (five items; e.g., "Do you feel anxious or awkward when meeting local people?"). Participants rated each item on a 5-point scale (1 = *Definitely not*, 5 = *Definitely yes*). The average score of each shock subscale was calculated, with a higher score indicting higher level of shock in the particular domain. The data exhibited adequate consistency for each dimension and for the total scale (core shock, $\alpha = 0.71$; interpersonal stress, $\alpha = 0.66$; total, $\alpha = 0.81$).

Subjective well-being

Subjective well-being in the U.S. context was measured through three indices: life satisfaction, positive affect and negative affect (Sheldon & Elliot, 1999). Participants were instructed to "indicate to what extent you generally feel this way, here in the U.S." The Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985) was adopted to assess students' life satisfaction. The SWLS consists of five items (e.g., "I am satisfied with my life"). Individuals rated their agreement or disagreement with each statement on a 5-point scale (1 = *Strongly disagree*, 5 = *Strongly agree*). The scale demonstrated excellent internal consistency ($\alpha = 0.80$). Participants' positive and negative affect was measure through the 20-item Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). The PANAS includes 10 items for positive affect (e.g., "interested") and 10 items for negative affect (e.g., "upset"). Participants were asked to rate how much they generally experienced each given affect using a 5-point scale (1 = *Not at all*, 5 = *Extremely*). The average score for each affect was calculated, with a higher score indicating a higher level of a particular affect. The internal consistency (α) was 0.80 for positive affect and 0.84 for negative affect. The SWLS and PANAS have been used and validated in many different countries (e.g., Liang & Zhu, 2015).

Control variables

We measured the following additional variables in our analyses since previous studies have demonstrated that they have influence on acculturation (e.g., Goldstein & Keller, 2015; Zhang & Goodson, 2011). Our goal was to show that motivation has effects independent of the control variables.

Big five personality traits. We measured big five personality traits (i.e., Openness, Extraversion, Agreeableness, Conscientious, Neuroticism) using the 10-Item Personality Inventory (Gosling, Rentfrow, & Swann, 2003). This measure includes two bipolar items per trait (e.g., Extraversion: "extraverted, enthusiastic" vs. "reserved, quiet"). Participants rated items according to how they saw themselves in general, using a 5-point scale ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*).

External difficulties. We also measured difficulties in language, communication, and surroundings using the "external causes of shock" subscale of Causes of Culture Shock Scale (CCSS; Goldstein & Keller, 2015). Participants were asked to indicate the extent to which certain events are perceived as contributing to culture shock (e.g., "Interacting with people who differ from you") on a 5-point scale (1 = *Strongly disagree*, 5 = *Strongly agree*). The 8-item subscale demonstrated a good internal consistency in the present study ($\alpha = 0.83$).

Previous international travel experience. Two items were used to assess previous international travel experience: "How many countries or regions have you visited before you came to the U.S.?" and "How many times have you traveled abroad before you came to the U.S.?" Participants responded using a 5-point scale (1 = *Never*, 2 = *One (once)*, 3 = *Two to five (two to five times)*, 4 = *Five to ten (five to ten times)*, 5 = *More than ten (more than ten times)*). The average score was calculated as our indicator of previous travel experience.

Prior knowledge of the U.S. Participants were also asked to indicate their prior knowledge of the U.S. (i.e., "How familiar were you with American culture?", via a 1 = *Not at all* to 5 = *Extremely well* scale.) and a *length of stay in the U.S.* variable (i.e., "How many months have you been in the U.S. so far?").

Basic demographic variables. Participants' age and gender were also measured.

Analytical strategy

Structural equation modeling (SEM) procedures using Mplus 7.0 with maximum likelihood estimation were employed for key hypotheses tests.

In the SEM, a parceling approach procedure was used to aggregate items to form observed indicators per construct (Little, Cunningham, Shahar, & Widaman, 2002). The parceling approach reduces the number of observed variables in the model, which leads to a more parsimonious model while providing greater power to test the relations among latent variables (Little, Rhemtulla, Gibson, & Schoemann, 2013). First, we computed four observed indicators of a latent self-determined motivation (SDM) variable by applying the formula described (intrinsic + identified + positive introjected − negative introjected − external − amotivation) to either the first item of each of the six CRAI subscales, the second item, the third item, or the fourth item. That is, we created four observed indicators. This method integrates scores on each motivation subscale under a single latent score, a parceling technique that has been used in previous SDT studies (Amiot, Blanchard, & Gaudreau, 2008; Guay, Mageau, & Vallerand, 2003; Standage, Duda, & Ntoumanis 2006). We created a latent variable for subjective well-being (SWB) using life satisfaction, positive affect, and negative affect as observed indicators. The two subscale-scores of the culture shock questionnaire (i.e., core shock and interpersonal stress) were used as the observed indicators for a latent variable of culture shock (CS). We also created a latent variable for basic psychological need satisfaction (BPNS), using autonomy, competence and relatedness need satisfaction as indicators. The goodness of fit of the model was evaluated by the following indices: CFI (acceptable if above 0.90), TLI (acceptable if above 0.90), RMSEA (acceptable if below 0.08), and SRMR (acceptable if below 0.08) (Hu & Bentler, 1999).

The mediating effect of basic psychological need satisfaction was tested using the accelerated-bias-corrected bootstrap estimation procedure, which yields the most accurate confidence intervals (CIs) for the indirect effects (MacKinnon, Lockwood, & Williams, 2004). In the procedure, the given sample size was randomly resampled 1000 times with replacement, and then 1000 estimations of the indirect effect were calculated. When the 95% CI for an indirect effect did not include zero, the indirect effect was significant (MacKinnon et al., 2004).

Results

Preliminary analyses

Table 1 presents the descriptive statistics and the bivariate correlations for the key variables. As expected, self-determined motivation was positively correlated with the three basic psychological need variables, with life satisfaction, and with positive affect, but was negatively associated with the two aspects of culture shock and with negative affect. In addition, the three basic psychological need variables were positively correlated with life satisfaction and positive affect, and negatively associated with two aspects of culture shock and negative affect.

Table 1
Descriptive Statistics and Bivariate Correlations for Key Variables.

Variable	M	SD	1	2	3	4	5	6	7	8
1 Self-determined Motivation	5.90	3.10	–							
2 Autonomy Satisfaction	3.51	0.63	.40***	–						
3 Competence Satisfaction	3.43	0.63	.32***	.62***	–					
4 Relatedness Satisfaction	3.49	0.66	.31***	.50***	.44***	–				
5 Core Shock	2.84	0.69	−0.25**	−0.51***	−0.32***	−0.46***	–			
6 Interpersonal Stress	2.46	0.75	−0.39***	−0.48***	−0.44***	−0.29***	.62***	–		
7 Life Satisfaction	3.40	0.70	.23**	.35***	.29***	.38***	−0.28**	−0.19*	–	
8 Positive Affect	3.47	0.66	.45***	.42***	.40***	.39***	−0.40***	−0.39***	.38***	–
9 Negative Affect	2.29	0.68	−0.19*	−0.47***	−0.39***	−0.38***	.52***	.45***	−0.23**	−0.17

Note: $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$.

Measurement model

The measurement model for the four latent variables (SDM, BPNS, CS, and SWB) was tested, and the result revealed an acceptable fit to the data: (χ^2 (47) = 77.669, $p < 0.01$, CFI = 0.964, TLI = 0.950, RMSEA = 0.071, SRMR = 0.056). All the standardized factor loadings for the indicators on the latent variables were statistically significant ($|\lambda|$ ranging from 0.45 to 0.92, $ps < 0.001$), signifying that the four latent variables were well represented by their respective indicators. Given the adequacy of the measurement model, the structural model was examined next.

Structural model

The structural model was estimated modeling SDM as a predictor, BNPS as a mediator, and SWB and CS as the outcome variables. Initially, we controlled all the following variables on each structural path in our model: age, gender, big five personality traits, previous travel experience, length of stay in the U.S., prior knowledge of the U.S., and external difficulties. Then, control variables that were not contributing to the model were removed one by one, starting with the one with the lowest standardized coefficient, until only significant coefficients remained. The final structural model evidenced an acceptable model fit: (χ^2 (100) = 149.134, $p < 0.01$, CFI = 0.950, TLI = 0.937, RMSEA = 0.067, SRMR = 0.061). The following covariates remained in the final model: extraversion ($\beta = 0.26$, $p < 0.05$), neuroticism ($\beta = -0.35$, $p < 0.001$), and external difficulties ($\beta = -0.28$, $p < 0.01$) were associated with BPNS; external difficulties ($\beta = 0.35$, $p < 0.001$) and age ($\beta = -0.17$, $p < 0.05$) were associated with CS; neuroticism ($\beta = -0.28$, $p < 0.01$) and length of stay in the U.S. ($\beta = -0.18$, $p < 0.01$) were associated with SWB. Other control variables (e.g., gender) did not significantly influence main variables and were excluded from the model, and they were ignored henceforth.

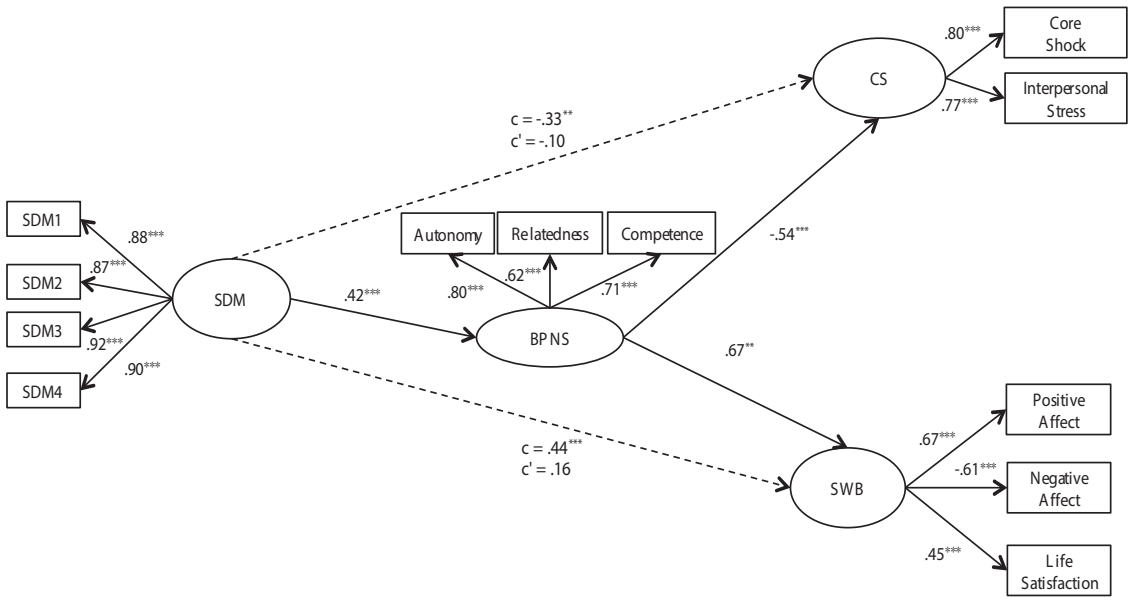

Fig. 1. The Structural Model.
Note: Standardized coefficients are reported. c = total effect, c' = direct effect. Endogenous error correlations and control variables are not shown in figure for parsimony. SDM1-SDM4 = four observed indicators for SDM.

A presented in Fig. 1, the total effect of SDM on CS and on SWB in the absence of the BPNS was significant (for CS, $\beta = -0.33$, $p < 0.01$; for SWB $\beta = 0.44$, $p < 0.001$). SDM was positively associated with BPNS ($\beta = 0.42$, $p < 0.001$). BPNS was negatively associated with CS ($\beta = -0.54$, $p < 0.001$), but was positively associated with SWB ($\beta = 0.67$, $p < 0.001$). Moreover, the indirect effect of BPSN between SDM and CS was significant (indirect effect = −0.23, $p < 0.001$, 95% CI = [−0.40, −0.12]) and the indirect effect of BPNS between SDM and SWB was significant (indirect effect = 0.28, $p < 0.01$, 95% CI = [.14, 0.51]). After accounting for the mediating effect of BPNS, the direct effect of SDM on CS was decreased to non-significance ($\beta = -0.10$, $p = 0.44$), and the direct effect on SWB was also decreased to non-significance ($\beta = 0.16$, $p = 0.15$). The present results suggested that BNPS fully mediated the positive relationship between SDM and SWB, and also fully mediated the negative relationship between SDM and CS.

To examine whether each of three basic psychological needs would serve singly as a mediator in the relationship between self-determined motivation and culture shock, and the relationship between self-determined motivation and subjective well-being, we further conducted three separate models including three dimensions of basic psychological needs as the mediator for each outcomes, respectively. The results showed that each need mediated the negative relationship between self-determined motivation and culture shock respectively (autonomy: indirect effect = −15, $p < 0.01$, 95% CI = (-0.25, −0.08); competence: indirect effect = −0.08, $p < 0.01$, 95% CI = (-0.12, −0.01); relatedness: indirect effect = −0.09, $p < 0.001$, 95% CI = (-0.15, −0.03); and each need also mediated the positive relationship between self-determined motivation and subjective well-being respectively (autonomy: indirect effect = 0.16, $p < 0.01$, 95% CI = (.07, 0.27); competence: indirect effect = 0.10, $p < 0.01$, 95% CI = (.03, 0.16); relatedness: indirect effect = 0.10, $p < 0.05$, 95% CI = (.03, 0.19).

Discussion

Using an SDT framework, the present study extends previous findings and addresses gaps in the culture shock literature. Even after controlling for the significant effects of demographic variables, and of neuroticism and extraversion, and of external difficulties, and of length of stay in the U.S., self-determined motivation for studying abroad was negatively associated with culture shock in these international students, and was positively associated with their subjective well-being in the foreign context. Moreover, we found that basic psychological needs satisfaction (autonomy, competence, and relatedness) fully mediated the negative relationship between self-determined motivation and culture shock, as well as the positive relationship between self-determined motivation and subjective well-being.

Consistent with many other studies in many other domains (e.g., school, sport, and work), self-determined motivation for studying abroad was associated with higher levels of life satisfaction and positive affect, and lower level of negative affect (Deci & Ryan, 2000; Kins, Beyers, Soenens, & Vansteenkiste, 2009; Ryan & Deci, 2000b). In addition, we found that highly self-determined international students were less likely to suffer from culture shock in the U.S. This might be because self-determined motivation helps students be more open to novel experiences (Hodgins & Knee, 2002) and provides them with important resources against the stress of the unfamiliar foreign context (Vansteenkiste & Ryan, 2013), which, in turn, mitigates loneliness, anxiety and other maladaptive consequences (Iso-Ahola & Park, 1996).

Another novel finding of the present study was that basic psychological needs satisfaction fully mediated the relationship between self-determined motivation and international students' positive acculturation (i.e., lesser culture shock and greater subjective well-being). Self-determined students are more likely to satisfy all three basic psychological needs in the new cultural environments, compared to those students with controlled motivation. When people feel self-determined, their behavior is congruent with their deeper sense of self and integrated values (Deci & Ryan, 2000b), satisfying their daily autonomy needs. Also, self-determined students are more likely to gain higher self-efficacy and better performance (Hanus & Fox, 2015; Turner, Chandler, & Heffer, 2009), thus satisfying the need for competence (Black & Deci, 2000). At the same time, self-determined international students are better prepared to engage in social activities and build connections with the new people they encounter in the foreign situation, generating higher relatedness satisfaction (Weinstein & Ryan, 2010). In turn, the satisfaction of three basic psychological needs contributed significantly to international students' subjective well-being, and also prevented them from experiencing culture shock. Taken together, the present study confirms the positive *cascading effect* of basic psychological needs satisfaction (Vansteenkiste & Ryan, 2013) by identifying it as a critical mediator between study abroad academic motivation and successful adaptation to the foreign context.

Regarding the control variables, our study demonstrated that international students high on extraversion and low on neuroticism demonstrated higher level of basic psychological needs satisfaction and a better acculturation in the U.S., which is in line with previous findings (e.g., Andreassen, Hetland, & Pallesen, 2010; Fang et al., 2016). In addition, external difficulties in language, communication and surroundings were negatively associated with international students' basic psychological needs satisfaction, and were positively associated with their culture shock (e.g., Goldstein & Keller, 2015; Zhang & Goodson, 2011). Moreover, older students reported lower levels of culture shock than younger students, perhaps because older students have become more adept at handling challenging situations (Poyrazli & Lopez, 2007). Finally, we found a negative relationship between the length of stay in the U.S. and subjective well-being. Previous research has demonstrated that the feeling of homesickness increased over time (Thurber, 1999), and such an effect may have operated to lower our sample's subjective well-being, over time. After ruling out all of these potential confounding effects, we observed that self-determined motivation for studying abroad continued to contribute uniquely to international students' acculturation and adjustment.

Contributions and implications

Contemporary approaches to acculturation suggest that successful adaptation for people in cultural transit involves being an active agent within the foreign environment, rather than being a passive victim of stress and uncertainties from the new culture (Zhou et al., 2008). The present study takes a significant step towards understanding what this means, by showing how self-determined motivation mitigates international students' culture shock and unhappiness. Our results also contributed to the literature on the cross-cultural applicability of SDT, supporting SDT's assumptions regarding the universality of motivational processes.

Moreover, the present study provides valuable suggestions for new interventions aimed at facilitating international students' positive adjustment. For instance, student motivation could be assessed before their departure, to identify motivational vulnerabilities. Counselors could work with students to achieve greater internalization of their travel motivation, so that they could arrive at the new location with a healthier sense of purpose and agency. In addition, cultural differences in terms of the concept of "self" might be considered in developing such interventions. For instance, previous studies have shown that international students from East Asia sometimes have a high level of introjected motivation for studying abroad, reflecting the strong expectations of family members (Chirkov et al., 2008). Ideally, acculturation counselors would be careful to support student autonomy in the process, by taking students' perspectives ("I know it feels like you are only going abroad in order to please your father"), and helping them to identify better rationales for themselves ("but lets talk about what might be in it for you, not just your father"). Such autonomy-supportive strategies have been demonstrated to cultivate students' self-determined motivation (Black & Deci, 2000), and fulfill their basic psychological needs (Gagné, Ryan, & Bargmann, 2003).

Limitations

The present study contains several limitations that are noteworthy. First, the cross-sectional design and the relatively small sample size of the study constrain the interpretation of causal effects. Further research with longitudinal designs using larger samples is needed to better examine the causal relationships and mediation effects. Also, longitudinal data could provide a better understanding of how self-determined motivation for studying abroad influences international students' acculturation process over time. When students first arrive, what do students who feel self-determined do differently, compared to students who don't feel self-determined? For instance, future studies could examine whether self-determined students accept more invitations, or go to more study sessions. A second limitation is that the present study employed only self-report measures, which might be susceptible to response bias (e.g., social desirability). Multiple methods for evaluation would be beneficial in future research. Third, given that most of our participants were Asian (especially Chinese) and the sample size was relatively small, we could not assess the specific role of nationality or region, which needs to be further explored. Finally, the current study only examined the effect of self-determination motivation for studying abroad in a sample of international students in the U.S. It would be desirable to test whether self-determined motivation would influence the adjustment in a sample of American students who intend to study outside the U.S.

Conflict of interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

References

Adler, P. S. (1975). The transitional experience: An alternative view of culture shock. *Journal of Humanistic Psychology, 15*(4), 13–23.
Amiot, C. E., Blanchard, C. M., & Gaudreau, P. (2008). The self in change: a longitudinal investigation of coping and self-determination processes. *Self and Identity, 7*(2), 204–224.
Andreassen, C. S., Hetland, J., & Pallesen, S. (2010). The relationship between 'workaholism', basic needs satisfaction at work and personality. *European Journal of Personality, 24*(1), 3–17.
Black, A. E., & Deci, E. L. (2000). The effects of instructors' autonomy support and students' autonomous motivation on learning organic chemistry: A self-determination theory perspective. *Science Education, 84*(6), 740–756.
Brislin, R., & Yoshida, T. (1994). *Intercultural communication training: An introduction.* Thousand Oaks, CA: Sage.
Chirkov, V. I., Ryan, R. M., Kim, Y., & Kaplan, U. (2003). Differentiating autonomy from individualism and independence: A self-determination theory perspective on internalization of cultural orientations and well-being. *Journal of Personality and Social Psychology, 84*(1), 97–110.
Chirkov, V. I., Ryan, R. M., & Willness, C. (2005). Cultural context and psychological needs in Canada and Brazil: Testing a self-determination approach to internalization of cultural practices, identity and well-being. *Journal of Cross-Cultural Psychology, 36*(4), 425–443.
Chirkov, V., Vansteenkiste, M., Tao, R., & Lynch, M. (2007). The role of self-determined motivation and goals for study abroad in the adaptation of international students. *International Journal of Intercultural Relations, 31*(2), 199–222.
Chirkov, V. I., Safdar, S., De Guzman, J., & Playford, K. (2008). Further examining the role motivation to study abroad plays in the adaptation of international students in Canada. *International Journal of Intercultural Relations, 32*(5), 427–440.
Chirkov, V. I. (2007). Culture, personal autonomy and individualism: Their relationships and implications for personal growth and well-being. In G. Zheng, K. Leung, & J. G. Adair (Eds.). *Perspectives and progress in contemporary cross-cultural psychology* (pp. 247–263). Beijing, China: China Light Industry Press.
Church, A. T., Katigbak, M. S., Locke, K. D., Zhang, H., Shen, J., de Jesús Vargas-Flores, J., & Ching, C. M. (2013). Need satisfaction and well-being: Testing self-determination theory in eight cultures. *Journal of Cross-Cultural Psychology, 44*(4), 507–534.
Deci, E. L., & Ryan, R. M. (2000). The what and why of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11*(4), 227–268.
Deci, E. L., Ryan, R. M., Gagné, M., Leone, D. R., Usunov, J., & Kornazheva, B. P. (2001). Need satisfaction, motivation, and well-being in the work organizations of a former eastern bloc country: A cross-cultural study of self-determination. *Personality and Social Psychology Bulletin, 27*(8), 930–942.
Diener, E. D., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment, 49*(1), 71–75.
Fang, K., Friedlander, M., & Pieterse, A. L. (2016). Contributions of acculturation, enculturation, discrimination, and personality traits to social anxiety among Chinese immigrants: A context-specific assessment. *Cultural Diversity and Ethnic Minority Psychology, 22*(1), 58–68.
Filak, V., & Sheldon, K. M. (2008). Teacher support, student motivation, student need satisfaction: and college teacher course evaluations: Testing a sequential path

model. *Educational Psychology, 28*, 711–724.
Gagné, M., Ryan, R. M., & Bargmann, K. (2003). Autonomy support and need satisfaction in the motivation and well-being of gymnasts. *Journal of Applied Sport Psychology, 15*(4), 372–390.
Gezentsvey, M., & Ward, C. (2008). Unveiling agency: A motivational perspective on acculturation and adaptation. In R. M. Sorrentino, & S. Yamaguchi (Eds.). *Handbook of motivation and cognition across cultures*. San Diego CA: Elsevier Inc.
Ginevra, M. C., Nota, L., Soresi, S., Shogren, K. A., Wehmeyer, M. L., & Little, T. D. (2015). A cross-cultural comparison of the self-determination construct in Italian and American adolescents. *International Journal of Adolescence and Youth, 20*(4), 501–517.
Goldstein, S. B., & Keller, S. R. (2015). US college students' lay theories of culture shock. *International Journal of Intercultural Relations, 47*, 187–194.
Gosling, S. D., Rentfrow, P. J., & Swann, W. B. (2003). A very brief measure of the Big-Five personality domains. *Journal of Research in Personality, 37*(6), 504–528.
Guay, F., Mageau, G. A., & Vallerand, R. J. (2003). On the hierarchical structure of self-determined motivation: A test of top-down, bottom-up, reciprocal, and horizontal effects. *Personality and Social Psychology Bulletin, 29*(8), 992–1004.
Gunnell, K. E., Crocker, P. R., Mack, D. E., Wilson, P. M., & Zumbo, B. D. (2014). Goal contents, motivation, psychological need satisfaction, well-being and physical activity: A test of self-determination theory over 6 months. *Psychology of Sport and Exercise, 15*(1), 19–29.
Hanus, M. D., & Fox, J. (2015). Assessing the effects of gamification in the classroom: A longitudinal study on intrinsic motivation, social comparison, satisfaction, effort, and academic performance. *Computers & Education, 80*, 152–161.
Harvey, N., & Park, T. (2012). Cultures and nursing. In (2nd australian ed.). A. Berman, S. Snyder, T. Levett-Jones, T. Dwyer, M. Hales, N. Harvey, Y. Luxford, L. Moxham, T. Park, B. Parker, K. Reid-Searl, & D. Stanley (Vol. Eds.), *Fundamentals of nursing concepts, process and practice: Vol. 1*, (pp. 357–376). Pearson Australia: Frenchs Forest.
Hodgins, H. S., & Knee, C. R. (2002). The integrating self and conscious experience. In E. L. Deci, & R. M. Ryan (Eds.). *Handbook of self-determination research* (pp. 87–100). Rochester, NY: The University of Rochester Press.
Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*(1), 1–55.
Institute of International Education (2016). "New International Student Enrollment, 2005/06-2015/16." Open Doors Report on International Educational Exchange. Retrieved from http://www.iie.org/opendoors.
Iso-Ahola, S. E., & Park, C. J. (1996). Leisure-related social support and self-determination as buffers of stress-illness relationship. *Journal of Leisure Research, 28*(3), 169–187.
Kins, E., Beyers, W., Soenens, B., & Vansteenkiste, M. (2009). Patterns of home leaving and subjective well-being in emerging adulthood: The role of motivational processes and parental autonomy support. *Developmental Psychology, 45*(5), 1416–1429.
Kwok, Y. Y., Chui, W. H., & Wong, L. P. (2013). Need satisfaction mechanism linking volunteer motivation and life satisfaction: A mediation study of volunteers subjective well-being. *Social Indicators Research, 114*(3), 1315–1329.
Liang, Y., & Zhu, D. (2015). Subjective well-being of Chinese landless peasants in relatively developed regions: Measurement using PANAS and SWLS. *Social Indicators Research, 123*(3), 817–835.
Little, T. D., Cunningham, W. A., Shahar, G., & Widaman, K. F. (2002). To parcel or not to parcel: Exploring the question, weighing the merits. *Structural Equation Modeling, 9*(2), 151–173.
Little, T. D., Rhemtulla, M., Gibson, K., & Schoemann, A. M. (2013). Why the items versus parcels controversy needn't be one. *Psychological Methods, 18*(3), 285–300.
MacKinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate Behavioral Research, 39*(1), 99–128.
Mouratidis, A., & Michou, A. (2011). Perfectionism, self-determined motivation, and coping among adolescent athletes. *Psychology of Sport and Exercise, 12*(4), 355–367.
Mumford, D. B. (1998). The measurement of culture shock. *Social Psychiatry and Psychiatric Epidemiology, 33*(4), 149–154.
Neubauer, A. B., & Voss, A. (2016). Validation and revision of a German version of the Balanced Measure of Psychological Needs Scale. *Journal of Individual Differences, 37*(1), 56–71.
Noels, K. A., Pelletier, L. G., Clément, R., & Vallerand, R. J. (2000). Why are you learning a second language? Motivational orientations and self-determination theory. *Language Learning, 50*(1), 57–85.
Oberg, K. (1960). Cultural shock: Adjustment to new cultural environments. *Practical Anthropology, 7*, 177–182.
Pelletier, L. G., Fortier, M. S., Vallerand, R. J., & Brière, N. M. (2001). Associations among perceived autonomy support, forms of self-regulation, and persistence: A prospective study. *Motivation and Emotion, 25*(4), 279–306.
Poyrazli, S., & Lopez, M. D. (2007). An exploratory study of perceived discrimination and homesickness: a comparison of international students and American students. *The Journal of Psychology, 141*(3), 263–280.
Presbitero, A. (2016). Culture shock and reverse culture shock: The moderating role of cultural intelligence in international students' adaptation. *International Journal of Intercultural Relations, 53*, 28–38.
Quested, E., Bosch, J. A., Burns, V. E., Cumming, J., Ntoumanis, N., & Duda, J. L. (2011). Basic psychological need satisfaction, stress-related appraisals, and dancers' cortisol and anxiety responses. *Journal of Sport and Exercise Psychology, 33*(6), 828–846.
Ryan, R. M., & Connell, J. P. (1989). Perceived locus of causality and internalization. *Journal of Personality and Social Psychology, 57*, 749–761.
Ryan, R. M., & Deci, E. L. (2000a). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology, 25*, 65–67.
Ryan, R., & Deci, E. (2000b). Self-determination theory and the facilitation of intrinsic motivation, social development and well-being. *American Psychologist, 55*, 68–78.
Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness.* New York: Guilford.
Sawir, E., Marginson, S., Deumert, A., Nyland, C., & Ramia, G. (2008). Loneliness and international students: An Australian study. *Journal of Studies in International Education, 12*(2), 148–180.
Sheldon, K. M., & Elliot, A. J. (1999). Goal striving, need satisfaction, and longitudinal well-being: The self-concordance model. *Journal of Personality and Social Psychology, 76*(3), 482–497.
Sheldon, K. M., & Hilpert, J. C. (2012). The balanced measure of psychological needs (BMPN) scale: an alternative domain general measure of need satisfaction. *Motivation and Emotion, 36*, 439–451.
Sheldon, K. M., Abad, N., Ferguson, Y., Gunz, A., Houser-Marko, L., Nichols, C. P., et al. (2010). Persistent pursuit of need satisfying goals leads to increased happiness: A 6-month experimental longitudinal study. *Motivation and Emotion, 34*, 39–48.
Sheldon, K. M., Cheng, C., & Hilpert, J. (2011). Understanding well-being and optimal functioning: Applying the Multilevel Personality in Context (MPIC) model. *Psychological Inquiry, 22*, 1–16.
Sheldon, K. M., Osin, E. N., Gordeeva, T. O., Suchkov, D. D., & Sychev, O. A. (2017). Evaluating the dimensionality of self-Determination theory's relative autonomy continuum. *Personality and Social Psychology Bulletin, 43*(9), 1215–1238.
Smith, R. A., & Khawaja, N. G. (2011). A review of the acculturation experiences of international students. *International Journal of Intercultural Relations, 35*(6), 699–713.
Standage, M., Duda, J. L., & Ntoumanis, N. (2006). Students' motivational processes and their relationship to teacher ratings in school physical education: A self-determination theory approach. *Research Quarterly for Exercise and Sport, 77*(1), 100–110.
Thurber, C. A. (1999). The phenomenology of homesickness in boys. *Journal of Abnormal Child Psychology, 27*(2), 125–139.
Turner, E. A., Chandler, M., & Heffer, R. W. (2009). The influence of parenting styles, achievement motivation, and self-efficacy on academic performance in college students. *Journal of College Student Development, 50*(3), 337–346.
Vansteenkiste, M., & Ryan, R. M. (2013). On psychological growth and vulnerability: Basic psychological need satisfaction and need frustration as a unifying principle. *Journal of Psychotherapy Integration, 23*(3), 263–273.
Vansteenkiste, M., Zhou, M., Lens, W., & Soenens, B. (2005). Experiences of autonomy and control among Chinese learners: Vitalizing or immobilizing? *Journal of*

Educational Psychology, 97(3), 468–483.
Ward, C., Bochner, S., & Furnham, A. (2001). *The psychology of culture shock.* Philadelphia: Routledge.
Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*(6), 1063–1070.
Wei, M., Shaffer, P. A., Young, S. K., & Zakalik, R. A. (2005). Adult attachment, shame, depression, and loneliness: The mediation role of basic psychological needs satisfaction. *Journal of Counseling Psychology, 52*(4), 591–601.
Weinstein, N., & Ryan, R. M. (2010). When helping helps: Autonomous motivation for prosocial behavior and its influence on well-being for the helper and recipient. *Journal of Personality and Social Psychology, 98*(2), 222–244.
Ying, Y. W., & Liese, L. H. (1991). Emotional well-being of Taiwan students in the US: An examination of pre-to post-arrival differential. *International Journal of Intercultural Relations, 15*(3), 345–366.
Yoo, S. H., Matsumoto, D., & LeRoux, J. A. (2006). The influence of emotion recognition and emotion regulation on intercultural adjustment. *International Journal of Intercultural Relations, 30*(3), 345–363.
Zhang, J., & Goodson, P. (2011). Predictors of international students' psychosocial adjustment to life in the United States: A systematic review. *International Journal of Intercultural Relations, 35*(2), 139–162.
Zhou, Y., Jindal-Snape, D., Topping, K., & Todman, J. (2008). Theoretical models of culture shock and adaptation in international students in higher education. *Studies in Higher Education, 33*(1), 63–75.